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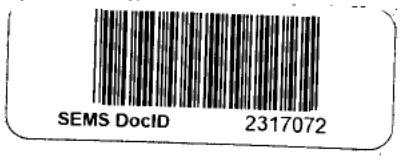

Weston Solutions, Inc.
1400 Weston Way
West Chester, PA 19380
610-701-3000 ● Fax 610-701-3186
www.westonsolutions.com

The Trusted Integrator for Sustainable Solutions

June 16, 2011

Charlene Creamer (3HS12)
Site Assessment Manager
U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, Pennsylvania 19103

Re: Stoney Creek Technologies, LLC
EPA Contract No.EP-S3-10-05
TDD No. WS03-10-10-002
Document Tracking No. WWS03-10-10-002.1A.00153

Dear: Ms. Creamer

Weston Solutions, Inc. (Weston) is submitting the final field sampling and analysis plan (FSP) for the Stoney Creek Technologies, LLC site. The FSP summarizes the proposed sampling at the site. If you have any questions regarding this plan, please call me at Not responsive due to revised scope.

Sincerely,

Not responsive due to revised scope

Senior Project Scientist

Attachment(s)

cc: TDD file

FINAL FIELD SAMPLING AND ANALYSIS PLAN
FOR THE
STONEY CREEK TECHNOLOGIES, LLC SITE
TRAINER, DELAWARE COUNTY, PENNSYLVANIA

Prepared for:

U.S. Environmental Protection Agency Region 3
Hazardous Site Cleanup Division
1650 Arch Street
Philadelphia, PA 19103

Prepared by:

Weston Solutions, Inc.
1400 Weston Way
West Chester, Pennsylvania 19380

EPA Contract No.: EP-S3-10-05
Technical Directive Document No.: WS03-10-10-002
Document Tracking No.: WWS03-10-10-002.1A.00153

June 16, 2011

ORIGINAL

FINAL FIELD SAMPLING AND ANALYSIS PLAN
FOR THE
STONEY CREEK TECHNOLOGIES, LLC SITE
TRAINER, DELAWARE COUNTY, PENNSYLVANIA

Prepared by: Not responsive due to revised scope Date: June 16, 2011
Project Manager

Approved by: Not responsive due to revised scope Date: June 16, 2011
Quality Assurance Officer

Approved by: Not responsive due to revised scope Date: June 16, 2011
Program Manager

Approved by: Charlene C. Creamer Date: JUNE 17, 2011
Charlene Creamer
EPA Work Assignment Manager

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FINAL FIELD SAMPLING AND ANALYSIS PLAN
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Quality Assurance Officer

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Program Manager

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Charlene Creamer
EPA Work Assignment Manager

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1.0 INTRODUCTION

Under the Eastern Area Superfund Technical Assessment and Response Team (START) Contract No. EP-S3-10-05, Technical Direction Document (TDD) No. WS03-10-10-002, the U.S. Environmental Protection Agency (EPA) Region 3 tasked Weston Solutions, Inc. (WESTON®) to conduct an Integrated Site Assessment at the Stoney Creek Technologies, LLC (SCT) site located in Trainer, Delaware County, Pennsylvania. The sampling strategy presented in this Field Sampling and Analysis Plan (FSP) emphasizes the collection of samples intended to meet analytical data requirements as presented in the *Guidance for Performing Site Inspections Under the Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) (EPA 1992). On-site soil and waste material samples will be collected to characterize and delineate site waste sources, on-site groundwater samples will be collected to evaluate the groundwater migration pathway and to document an observed release, and surface water and sediment samples will be collected from Stoney Creek to evaluate the surface water migration pathway and establish an observed release and actual contamination of a fishery.

This FSP presents site background information in Section 2.0, outlines project objectives and data use in Section 3.0, describes proposed field activities in Section 4.0, summarizes analytical parameters and methods in Section 5.0, specifies quality assurance and quality control (QA/QC) procedures in Section 6.0, presents proposed deliverables in Section 7.0, and outlines the proposed project schedule in Section 8.0. All references cited in this FSP are listed after the text. WESTON developed this FSP in accordance with the provisions of the *EPA Region III START 4 Program-Wide UFP QAPP* (WESTON 2010a).

1.1 KEY PROJECT PERSONNEL

The WESTON project task lead for the TDD is [redacted] The project task lead is responsible and accountable for all aspects of the project scope of work, including achieving the technical, financial, and scheduling objectives for the project. The project task lead will communicate directly with the EPA Site Assessment Manager (SAM) for this project, Ms. Charlene Creamer.

Other WESTON personnel proposed for the project are presented in Table 1. Technical or field support personnel used for the project may vary depending on the specific needs of the project, as well as on-site conditions and availability of staff.

2.0 BACKGROUND

This section describes the site location, presents a description of the site, and summarizes previous site investigation activities.

2.1 SITE LOCATION

The SCT site is located at 3300 West 4th Street in Trainer, Delaware County, Pennsylvania, as shown in Figure 1, Site Location Map (USGS 1989). The geographic coordinates of the approximate center of the site are 39.8300000 north latitude and -75.3975000 west longitude. As shown in Figures 1 and 2, the site is located in a mixed residential and industrial area (ESRI 2010). The site is bordered to the north by Conrail railroad tracks of the Northeast Corridor, beyond which are an automobile junkyard and a rail yard for the temporary storage of freight cars; to the east by a kitchen cabinet distributor; to the south by 4th Street, across which are residential homes, additional commercial and industrial facilities, and an oil refinery; and to the west by an automobile parts and service station.

2.2 SITE DESCRIPTION

The SCT site is situated on 14 acres of land bisected on the southeastern portion of the property by Stoney Creek. The process area, which includes office buildings, warehouses, a boiler house, a wastewater treatment plant (WWTP) and more than 250 above ground storage tanks (AST), encompasses 10 acres on the northeastern portion of the property. The process area is predominantly covered with concrete or asphalt. The 4 acres located on the southeast side of Stoney Creek were used as a bone yard and did not contain process equipment. Remnants of tanks and equipment are scattered throughout this area. This area is predominantly bare soil and

TABLE 1

PROPOSED WESTON PROJECT PERSONNEL

Project Function	Name	Role
Project Task Lead	Not responsive due to revised sco	The project task lead is responsible for implementing all activities identified in the TDD; responsible for developing and implementing the site health and safety plan; has authority to commit resources necessary to complete the work; prepares deliverables required by the TDD; communicates directly with the EPA SAM, the project team, and any other personnel needed to complete the project.
Field Support Personnel	To be determined (3)	The field support personnel perform necessary sampling or monitoring, as well as other tasks defined in the TDD or assigned by the EPA SAM or the WESTON project task lead; communicate directly with the WESTON project task lead and, when appropriate, the EPA SAM.
Health and Safety Officer	Not responsive due to revised sco	The health and safety officer oversees and supports development of the site health and safety plan; communicates directly with the WESTON project task lead to ensure that all corporate health and safety protocols applicable to the site are being followed
Chemist	TBD	The chemist coordinates with the WESTON project task lead regarding the analytical requirements for the project; solicits and procures necessary laboratory services; reviews and validates analytical data, if necessary; communicates directly with the WESTON project task lead, field support personnel, EPA SAM, and START program manager as necessary.
Sampling Coordinator	Not responsive due	The sampling coordinator coordinates with the WESTON project task lead and chemist and procures or arranges necessary laboratory services. If necessary, the sampling coordinator communicates directly with the WESTON project task lead, field support personnel, EPA SAM, and START program manager.
Graphics and Mapping Specialist	Not responsive due to re	The graphics and mapping specialist generates maps and other figures for project deliverables or presentations; assists the WESTON project task lead or other personnel when global positioning system activities are required. Prepares Scribe database.
Financial Manager	Not responsive due to revised scop	The financial manager works with the WESTON project task lead in planning related to the TDD budget and completion date; enters financial information on the project into the WESTON management information system; prepares regular and special reports to assist the WESTON project task lead in managing the project.
Program Manager	Not responsive due to revised scop	The project work scope manager assists the WESTON project task lead as necessary to implement the project; commits or helps obtain all necessary company resources to meet the objectives of the TDD; provides document quality control reviews; addresses and helps resolve project management issues with the WESTON project task lead
Quality Assurance Manager	Not responsive due to revis	The quality assurance manager is responsible for all quality assurance/quality control aspects of the START contract

Notes:
EPA = U.S. Environmental Protection Agency
START = Superfund Technical Assessment and Response Team
SAM = Site Assessment Manager
TDD = Technical Direction Document
WESTON = Weston Solutions, Inc.

ORIGINAL

Legend

Site Boundary

N

Feet
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Figure 1
Site Location Map

Stoney Creek Technologies
Trainer, Delaware County, PA

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Figure 2
Site Feature Map

Stoney Creek Technologies
Trainer, Delaware County, PA

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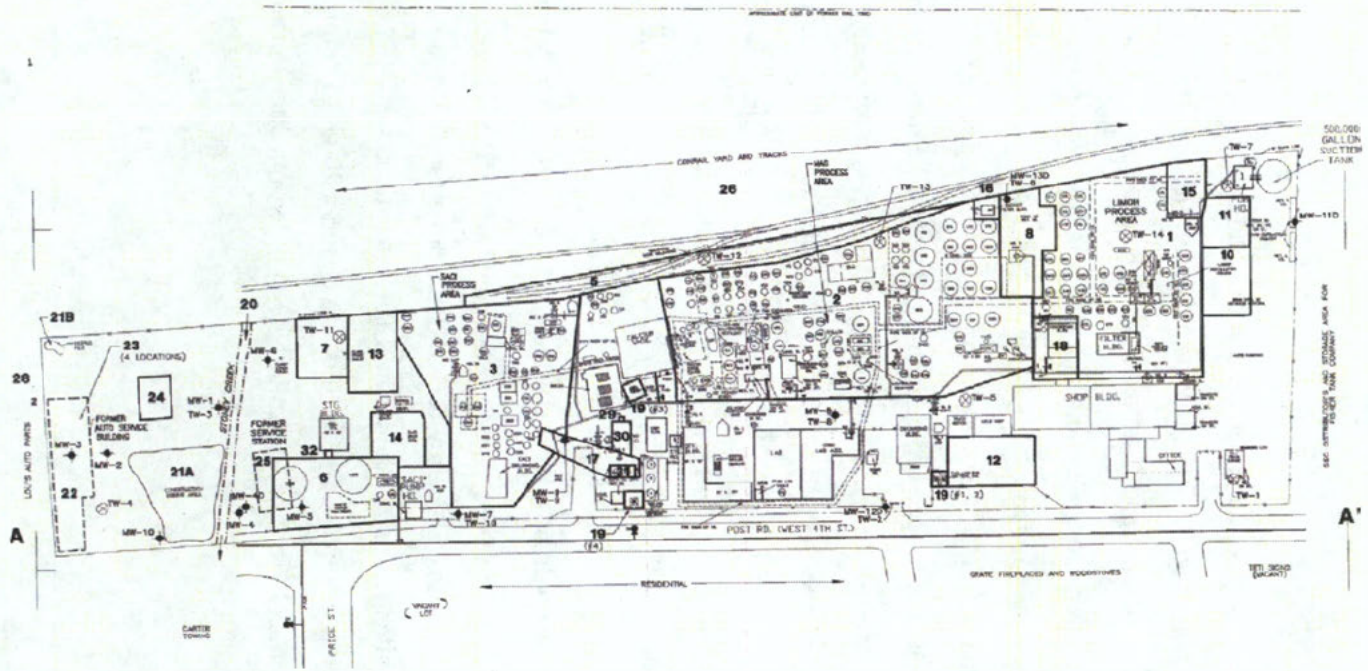
vegetated, with several concrete pads from previous structures. Along the western bank of Stoney Creek are approximately 1,500 to 2,000 cubic yards of construction debris and fill that originated from improvements made to the plant prior to 1990, mainly to on-site roadways. Stoney Creek flows approximately 0.5 mile from the site before it discharges into the Delaware River (Fluor Daniel GTI, Inc. 1997a). Figure 3 depicts the layout of the site.

2.3 OPERATIONAL HISTORY

Stoney Creek Technologies, Inc., a manufacturer of oil and fuel additives and corrosion inhibitors, purchased the Trainer facility from Witco Corporation in 1998. Witco and its predecessor, Bryton Chemical Company, had been manufacturing similar products through petroleum sulfonation, as Stoney Creek Technologies at the site since 1951 when Bryton Chemical Company purchased the property from Lehigh Chemical Company. It is not known the type of manufacturing that Lehigh Chemical Company performed at the site. Around the time that Witco purchased the site processing plant from Bryton Chemical Company in 1973, Witco also purchased additional tracts of land surrounding the original processing area to make-up what is now known as the SCT site. Various commercial, industrial, and chemical manufacturing operations were conducted on these additional tracts of land including plastics fabrication, concrete products, auto sales and service, retail petroleum sales, paint sales, and steel tank manufacturing (Fluor Daniel GTI 1997a).

In April 2007, Stoney Creek Technologies, Inc. declared bankruptcy. CERCLA funding was authorized on April 17, 2007 to assure that the chemicals at the facility were safeguarded in the absence of the SCT's ability to do so. EPA provided SCT the opportunity to remove the chemical inventory from the site themselves; however, EPA determined that SCT was not adequately addressing the potential threat at the facility. In October 2008, EPA initiated actions relating to the removal of chemical inventory from the Site in order to reduce the potential threats (WESTON 2010b).



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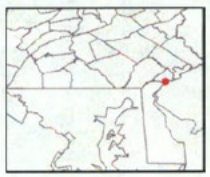

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Stoney Creek Technologies
Trainer, Delaware County, PA

Figure 3
Site Layout Map

WESTON SOLUTIONS

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The chemical manufacturing operations conducted by Witco, and then subsequently by Stoney Creek Technologies, included the production of calcium alkylbenzene sulfonates (LIMOH), magnesium akylbenzene sulfonates (MAG), and severe atmospheric corrosion inhibitors (SACI). LIMOH and MAG were produced as additives to oil, and SACI was produced as a corrosion inhibitor. Major components of plant production included the manufacture of sulfonic acid and heptane sulfonic acid (sulfonation); carbonation (with calcium or magnesium carbonates); filtering; and centrifuging. Solvents such as heptanes, mineral spirits, and alcohols were utilized in product manufacture (Fluor Daniel GTI, Inc 1997a).

Solvents used in the manufacturing process were recovered from liquid waste in a solvent recovery process (located in the MAG process area) and reused. Solid waste generated from filtering and centrifuge operations were stored on-site in several areas. The solid waste was mixed with fly ash prior to off-site disposal. Raw materials used in plant production were delivered to the site by tanker truck or rail car and then transferred into ASTs (Fluor Daniels GTI, Inc. 1997a).

The facility operated an on-site WWTP, which was constructed by Witco in the early 1970s. The WWTP received process wastewater and storm water collected from trenches and drains located throughout the plant. The WWTP consisted of an oil water separator, holding tanks for pH adjustment, and acid and caustic storage. Treated water was discharged to the public sanitary sewer. Prior to 1970, treated water was discharged to Stoney Creek via a former WWTP that had been constructed in 1957 (Fluor Daniels GTI, Inc. 1997a)

2.4 PREVIOUS INVESTIGATIONS

On March 1, 1985, a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Site Discovery was initiated for the site. In June 1986, a preliminary assessment (PA) was conducted of the site by the Pennsylvania Department of Environmental Protection (PADEP) on behalf of EPA Region 3. The PA was titled *Preliminary Assessment of Bryton Chemical Company*. Based on the PA, the site was given a low priority for additional actions under CERCLA (Fluor Daniels GTI, Inc. 1997a).

In June 1991, NUS Corporation, on behalf of EPA Region 3, conducted a second PA of the site. This PA was titled *Preliminary Assessment of the Witco Chemical Corporation.* Based on this PA, the site was assigned a "no further remedial action planned" designation (Fluor Daniels GTI, 1997a).

In June 1997, a Phase I Environmental Site Assessment was conducted on the property to identify and document current and historical operations and environmental conditions and to identify areas of concern (AOC) on the site and surrounding properties. The Phase I identified twenty-five on-site AOCs and three off-site AOCs as shown in Attachment 1 (Fluor Daniels GTI, 1997b)

In September 1997, a remedial investigation (RI) was conducted at the site. The RI included the advancement of 175 soil borings; the collection of 400 soil samples; the installation of 10 shallow monitoring wells, 14 temporary shallow wells, and four bedrock monitoring wells; the surveying and gauging of all monitoring wells; the collection of groundwater samples; the collection of two sediment samples from Stoney Creek; and a limited geophysical survey (Fluor Daniels GTI, Inc. 1997b).

Soil samples were analyzed for volatile organic compounds (VOC) base neutrals (i.e., semivolatile organic compounds [SVOC], polychlorinated biphenyls (PCB), metals, and sulfates. Soil analytical results were compared to Surface and Subsurface Non-residential Medium Specific Concentrations (MSC) and generic values for soil overlying Non-use Aquifers in accordance with Pennsylvania Act 2 Regulations. The RI concluded that collected soil samples did not exceed applicable criteria. Groundwater samples were analyzed for VOCs, SVOCs, and total and dissolved metals. Groundwater analytical results were compared to Non-use Aquifer, Non-residential Groundwater MSCs. The RI concluded that collected groundwater samples did not exceed applicable criteria. Sediment samples were analyzed for total petroleum hydrocarbons (TPH), gasoline range organics (GRO), SVOCs, and priority pollutant metals. Sediment analytical results were compared to EPA Effect Range Medium (ERM) Values. The RI concluded that concentrations of quantifiable SVOCs and metals were greater in the sediment

sample collected upstream of the site than in the sample collected downstream of the site (Fluor Daniels GTI, Inc. 1997b).

The RI also characterized and delineated these five AOCs: LIMOH Process Area, MAG Process Area, SACI process Area, Main Rail Sidings, and the former WWTP, where TPH concentrations exceeded the RI delineation of 10,000 milligrams per kilogram (mg/kg) in soil (Fluor Daniels GTI, Inc. 1997b).

Based on the RI, Witco filed a Notice of Intent to Remediate (NIR) to PADEP in June 1998. The NIR was acknowledged by PADEP in July 1998. Additional activities conducted by Witco as part of the NIR were to conduct quarterly groundwater sampling to confirm that applicable MSCs (Non-use, Non-residential Groundwater MSCs) were being attained; to confirm that substances did not exceed Used Aquifer MSCs within 1,000 feet of the property boundary; and to confirm that constituents in groundwater would not migrate to surface water bodies at concentrations that would cause exceedances of published surface water quality standards (IT Corporation 1999).

During the groundwater sampling events, light non-aqueous phase liquid (LNAPL) was observed in one monitoring well in the SACI process area. In September 1998, an LNAPL recovery system was installed in this area. Total fluids were continuously removed for one month for a total of 300 gallons of liquid removed. It was calculated that the 300 gallons of removed groundwater contained one gallon of LNAPL. Following the LNAPL removal in the SACI area, additional groundwater gauging was conducted to determine the quantity of any remaining LNAPL. It was determined that approximately 0.03 feet of LNAPL remained in the groundwater in the SACI area and extended over a maximum horizontal area of 30 feet (IT Corporation 1999).

In May 1999, Witco submitted a Final Report to PADEP demonstrating that the site met the criteria for attainment under ACT 2 for release of liability (IT Corporation 1999).

On April 12, 2007, EPA Region III was notified that the Stoney Creek facility had declared bankruptcy and that chemical substances remained on site, including approximately 3 million

gallons of flammable or combustible chemicals that posed a threat of release and fire, and more than 11 million pounds of total chemical production inventory that included flammable, combustible, and corrosive chemicals. Other chemical materials were also present in drums, small containers, open containers, water treatment vessels, fuel vessels, piles, trenches, drains, and other places. Additionally, several mounds of the fly ash material used to neutralize the solid waste generated from the filtering and centrifuge operations also remained on site.

In August 2007, EPA issued a Unilateral Administrative Order to the potential responsible parties (PRP) to remove the on-site hazardous materials.

In February 2009, EPA initiated removal actions at the site in response to the PRPs' failure to remove the site inventory of chemicals. To date, more than 2,000,000 gallons of bulk chemical inventory from on-site tanks, drums, and in pipelines have been removed for off-site disposal. EPA continues to clean out and consolidate material remaining in tanks and pipelines for off-site disposal.

EPA also continues to investigate the origin of the oily material that discharges into Stoney Creek, and bubbles up in the sidewalk and into the street during heavy rain events. In October 2010, EPA contractors, WESTON, conducted a site-wide subsurface soil investigation to determine the extent of contamination at the site. A total of fifty-six soil borings were advanced throughout the site. WESTON collected a total of twenty-seven samples from the fifty-six soil borings. The samples were collected at locations that had elevated VOC readings on a flame ionization detector (FID). The majority of the samples were analyzed for TPH, GRO, diesel range organics (DRO), and methanol. Six of the twenty-seven samples were analyzed for Target Compound List (TCL) VOCs, SVOC, PCBs, pesticides, and Target Analyte List (TAL) inorganics.

In the six samples analyzed for VOCs, methylcyclohexane was detected up to a concentration of 71,000 micrograms per kilogram (µg/kg), cyclohexane up to 8,500 µg/kg, 1,2-dichloroethene up to 16 µg/kg, benzene up to 710 µg/kg, trichloroethene up to 9.7 µg/kg, toluene up to 61 µg/kg, tetrachloroethene up to 26 µg/kg, ethylbenzene up to 55 µg/kg, xylene up to 4,700 µg/kg, and

isopropylbenzene up to 130 µg/kg. Additionally, the following SVOCs were detected in the six samples at concentrations above the detection limits: naphthalene up to 800 µg/kg, 2-methylnaphthalene up to 1,600 µg/kg, phenanthrene up to 400 µg/kg, flouranthene up to 980 µg/kg, pyrene up to 1,700 µg/kg, benzo(a)pyrene up to 420 µg/kg, indeno(1,2,3-cd)pyrene up to 400 µg/kg, and benzo(g,h,i)perylene up to 870 µg/kg. Inorganics detected in the samples include chromium up to 277 mg/kg and manganese up to 378 mg/kg,

3.0 OBJECTIVE AND DATA USE

The objective of this Site Inspection sampling event is to collect sufficient sampling data to determine if the site warrants additional work under CERCLA. Analytical data will be used to prepare a Site Inspection report and calculate a preliminary Hazard Ranking System (HRS) score.

4.0 PROPOSED ACTIVITIES

This section describes the scope of work, including proposed sampling activities and field measurements; summarizes the sampling for the project; describes how samples will be handled; and describes equipment decontamination procedures for the project.

4.1 SCOPE OF WORK

As part of the Site Inspection field investigation for the SCT site, WESTON will perform the following tasks:

- Collect seven surface (0 to 6 inches below ground surface [bgs]) and two subsurface (24 to 48 inches bgs) soil samples from the area west of Stoney Creek, including one duplicate sample for quality assurance and quality control (QA/QC) purposes.
- Collect two soil samples from the debris/fill area adjacent to Stoney Creek.
- Collect five surface soil (0 to 6 inches bgs) samples from exposed areas throughout the process area, including one duplicate sample for QA/QC purposes.
- Collect two surface (0 to 6 inches bgs) and two subsurface (24 to 48 inches bgs) soil samples from the area surrounding the drip pans along the rail siding.
- Collect two surface (0 to 6 inches bgs) and two subsurface (24 to 48 inches bgs) soil samples at an off-site location to document background conditions.
- Collect two solid waste samples of the fly ash material.

- Collect five surface water and sediment samples from Stoney Creek, including one duplicate sample of each matrix for QA/QC purposes.
- Collect one wastewater and one sludge sample from the current WWTP holding basin
- Install two monitoring wells upgradient of the process area to document upgradient groundwater conditions.
- Collect eight groundwater samples from select on-site monitoring wells (5 existing wells and the 2 newly installed upgradient wells), including one duplicate sample for QA/QC purposes.
- Document and record sample locations using global positioning system (GPS) technology and enter sample location information into Scribe.
- Photo document sampling activities and sampling locations.
- Package and ship all samples collected to an EPA Contract Laboratory Program (CLP) laboratory for the following analyses: TCL VOCs, SVOCs, pesticides, and PCBs; and TAL inorganics, including mercury and cyanide.

4.2 SAMPLE COLLECTION

This section describes the proposed sampling activities and summarizes the identifiers, quantities, and locations for each sample to be collected as part of the Site Inspection field activities.

4.2.1 Soil Sampling

WESTON will collect surface (up to 6 inches bgs) and subsurface (24 to 48 inches bgs) soil samples in accordance with WESTON Standard Operating Procedure (SOP) No. 302, "*Surface Soil Sampling*" (WESTON 2006a) and WESTON SOP No. 304 "*Subsurface Soil Sampling*" (WESTON 2006b).

A total of 20 surface and subsurface soil samples will be collected during this sampling event, including two duplicate samples for QA/QC purposes. Additionally, two surface and two subsurface background samples will be collected from areas not suspected of being impacted by the site to document typical soil constituents found in the area. WESTON will also collect two solid waste samples of the fly ash material in the same manner as the surface soil samples. These samples will also be analyzed for the same parameters as the surface soil samples.

At each surface soil sampling location, WESTON will first collect soil for VOC analysis using an En Core® sampling device. In the event an En Core® sampling device cannot be used due to adverse soil conditions (such as, rocky, sandy, or moist soil), WESTON will collect the sample for VOC analysis by placing the soil directly in a 4-ounce jar with septum using a disposable polyethylene scoop. After collecting soil for VOC analysis, WESTON will collect additional soil for SVOC, PCB, pesticide, TAL inorganics, and cyanide analyses. This soil will be homogenized in an aluminum pan prior to placement in two 8-ounce sample jars – one to be analyzed for SVOCs, PCBs, and pesticides, and one to be analyzed for TAL inorganics and cyanide.

At six of the surface sampling locations, WESTON will also collect subsurface samples. After collecting the surface soil sample, WESTON will use a hand auger to auger down below 24 inches bgs. Subsurface soil will be collected in the same manner as the surface soil samples and analyzed for the same parameters. WESTON will use an ENCORE® T-handle extension to directly collect the sample for VOC analysis.

4.2.2 Surface Water and Sediment Sampling

WESTON will collect the surface water and sediment samples in accordance with WESTON SOPs No. 203 "*Surface Water Sampling*" (WESTON 2006c) and No. 303 "*Sediment Sampling*" (WESTON 2006d). WESTON plans to collect a total of five surface water and sediment samples from Stoney Creek; one upstream of the site as a background sample, two adjacent to the site approximately 50 feet apart, and one downstream of the site. An additional surface water and sediment sample from Stoney Creek will also be collected as duplicate samples for QA/QC purposes. WESTON will also collect one wastewater and one sludge sample from the existing WWTP pre-treatment holding basin. WESTON will collect the wastewater and sludge samples by the same collection methods as the surface water and sediment samples, respectively, as described below.

WESTON will begin collecting samples starting from the farthest downstream location. At each sampling location, WESTON will first collect surface water samples directly into sample

containers by submerging the containers below the surface of the water. After the surface water sample is collected, WESTON will collect the sediment sample. WESTON will collect the sediment sample for VOC analysis by using a disposable polyethylene scoop to place the sediment directly in a 4-ounce jar with septum. After collecting the sediment for VOC analysis, WESTON will collect additional sediment for SVOC, PCB, pesticide, and TAL inorganics and cyanide analyses. This sediment will be homogenized in an aluminum pan prior to placement in two 8-ounce sample jars–one to be analyzed for SVOCs, PCBs, and pesticides and one to be analyzed for TAL inorganics and cyanide.

4.2.3 Groundwater Monitoring Well Installation

Two monitoring wells will be installed at the site to document background, upgradient groundwater conditions. Due to the southern groundwater flow direction beneath the site, one well will be installed along the northern edge of the SACI process area, with a second well installed in the far northeast corner of the property. The monitoring wells will be installed by a qualified drilling subcontractor using Hollow-Stem Auger (HAS) drilling methods in accordance with EPA ERT SOP No. 2048, *"Monitor Well Installation"* (EPA ERT 2001). After initially augering to 2 feet below grade, continuous split-spoon samples will be collected ahead of the augers to the base of each borehole. Drill cuttings and split-spoon samples from the boreholes will be screened for organic vapors using a field calibrated, flame or photo ionization detector (FID or PID), and described and logged by the on-site WESTON geologist/technician. All lithology descriptions and instrument readings will be recorded in a field logbook. Based on existing site groundwater information, the monitoring wells will be installed to approximately 10 feet bgs and screened across the top of the water table to account for the potential of floating product. The wells will be constructed of 2-inch diameter, 0.01-0.02-inch slotted, schedule 40 polyvinylchloride (PVC) screen and riser. The screened portion of the wells will be filter-packed with 20/40-grade, medium sand at minimum 1 foot above the top of the well screen as the augers are withdrawn. If practical, a 1 foot bentonite seal will be placed above the sandpack and a flush-mounted, concrete well pad and steel well cover will be installed at grade. All wells will be affixed with bottom caps and locking, surface expansion caps.

Following installation, the new upgradient wells and 5 existing on-site wells (listed on **Table 2**) will be manually developed using dedicated, check valve bailers in accordance with EPA ERT SOP No. 2044, *"Monitor Well Development"* (EPA ERT 2001). The 5 existing monitoring wells planned for sampling are being redeveloped during this field effort to remove any stagnant water that has accumulated since they were installed by EPA ERT in 2009. These 5 existing wells were selected based upon either elevated historical FID readings or their locations in areas of concern on site. Prior to commencing development activities, a complete round of static water level measurements will be collected from all 7 monitoring wells. Bailing development of the wells will be performed until a minimum of 3 well volumes have been removed, the discharge water is relatively clear (sediment free) and general water quality parameters have stabilized as follows:

- pH: ±0.1 unit
- Specific conductance: ±3%
- ORP (Eh): ±10 mV
- DO: ±10%
- Temperature ±0.1 °C

Stabilization of parameters is generally defined as 3 consecutive readings, collected 5 minutes apart using a field water quality instrument (YSI or equivalent). Bailing development is the method of choice in shallow or small diameter wells and eliminates the potential for clogging and fouling of submersible pumps (EPA ERT 2001). The use of dedicated bailers for development will also eliminate the need for decontamination of submersible pumps, which could be extensive in a Non-Use Aquifer such as exists beneath the site. All well development data and water level measurements will be recorded by WESTON personnel in the site field logbook. Purge water generated during well development will be containerized for discharge and treatment into the on-site WWTP.

At the conclusion of well development activities, a complete round of static water level measurements will again be collected from all 7 on-site wells. Provided water levels have recovered to within 75% of their static water levels measured prior to development, passive diffusion bag samplers (PDBs) will be placed at the midpoint of the screen in each well. Two

PDB samplers will be placed into the well selected for duplicate analyses for QA/QC purposes. Water-filled PDB samplers have been shown to be suitable for obtaining concentrations of VOCs in groundwater monitoring wells provided they have been given a minimum of 2 weeks to achieve equilibrium (Vroblesky, D.A. 2002). The PDB samplers will subsequently be retrieved for VOC analyses 2 weeks later, prior to purging and sampling of the wells for the remaining analytes planned for this assessment program. PDB sampling will be performed in accordance with the *User's Guide for Polyethylene-Based Passive Diffusion Bag Samplers to Obtain Volatile Organic Compound Concentrations in Wells* (Vroblesky, D.A. 2002). Sampling for VOCs using PDB samplers is recommended at the site due to the extremely shallow well screens and groundwater depths at the site. Sampling with PDB samplers will eliminate the potential volatilization of samples which could be caused by the purging process.

4.2.4 Monitoring Well Sampling

Approximately 2 weeks following development of the wells, WESTON will collect groundwater samples from the 7 wells, with a duplicate sample collected from one of the wells for QA/QC purposes. Prior to commencing purging and sampling activities, WESTON will collect a round of static water levels from all 7 wells in accordance with WESTON SOP No. 204, *Water Level Measurements* (WESTON 2006e). The PDB samplers will then be removed from all 7 wells and transferred into three 40-milliliter volatile organic analysis (VOA) vials, pre-preserved with hydrochloric acid to a pH of 2, and placed on ice in preparation for shipment.

All wells will then be purged using dedicated, check valve bailers and a 3-volume purge methodology in accordance with WESTON SOP No. 201, *Groundwater Well Sampling* (WESTON 2006f). Water quality parameters, including pH, turbidity, specific conductance, dissolved oxygen, Eh/ORP and temperature will be measured in accordance with WESTON SOP No. 210, *Field pH, Conductivity, and Temperature Measurement* (Weston 2006g) using a field calibrated YSI meter or equivalent. Water quality parameters will be measured and recorded at 5-minute intervals with stabilization being defined as three consecutive readings within the following criteria:

- pH: ±0.1 units
- Specific Conductance ±3%
- Eh/ORP: ±10 mv
- DO: ±10%
- Temperature: ±0.1 °C

Achievement of turbidity levels of less than 50 NTU, while desirable, will not be required but should be recorded. If stabilization of the remaining indicator parameters has not occurred after 3 calculated well volumes have been removed, purging will continue until a maximum of 4 well volumes have been removed. Once stabilization or 4 well volumes have been removed, samples will be collected for SVOCs, PCBs, and pesticides in four unpreserved 1-liter amber jars; for TAL metals in one 1-liter polyethylene bottles preserved with nitric acid to a pH of 2; and for cyanide in one 1-liter polyethylene bottles preserved with sodium hydroxide to a pH of 12. The samples will be placed on ice and shipped to an approved CLP laboratory under full chain-of-custody. All purge water generated during groundwater sampling will be containerized for discharge and treatment into the on-site WWTP.

4.3 SAMPLE SUMMARY

All sample identifiers will be designated in accordance with the following format:

SCT-SS-XX

The "SCT" prefix refers to the site name – Stoney Creek Technologies site. The "SS" portion refers to the sample matrix ("SS" for surface soil, "SB" for subsurface, "WS" for waste sample, "SW" for surface water, "SD" for sediment, "WW" for wastewater, "SL" for sludge, "MW" for monitoring well, "TB" for trip blank, "FB" for field blank, and "RB" for rinsate blank). The "XX" portion of the suffix refers to the unique sample number at a specific sampling location. Table 2 summarizes the sample identifiers, matrices, locations, and rationale for the sampling event. The proposed sampling locations are illustrated on Figure 4, Proposed Sample Location Map.

4.4 SAMPLE HANDLING AND PREPARATION

The WESTON site manager will assure that sample quality and integrity are maintained in accordance with WESTON's *EPA Region III START 4 Program-Wide UFP QAPP* (WESTON, 2010a). Sample handling, packaging, and shipment procedures will be in accordance with U.S. EPA Region III Sample Submission Procedures (EPA 2009) and WESTON's *Environmental Sample Shipment Checklist* (WESTON 2010c). In general, sample containers will be labeled and shipped, with a sample label, tag, and custody seal affixed to each container. Samples will be placed in sealed plastic bags. Bagged containers will be placed in appropriate transport containers and the containers will be packed with appropriate absorbent material and preserved with ice. All sample documents (i.e., Scribe, chain-of-custody, and traffic reports) will be affixed to the underside of each transport container lid. The lid will be sealed with shipping tape, and custody seals will be affixed to the transport container. Transport containers will be labeled with the origin and destination locations. Samples will be shipped to a CLP laboratory.

Regulations for packaging, marking, labeling, and shipping hazardous materials and wastes are promulgated by the U.S. Department of Transportation. Air carriers that transport hazardous materials (in particular, Federal Express) require compliance with the current International Air Transport Association (IATA) regulations, which apply to shipment and transport of hazardous materials by air carrier. WESTON will follow all applicable IATA regulations.

TABLE 2

SAMPLING SUMMARY

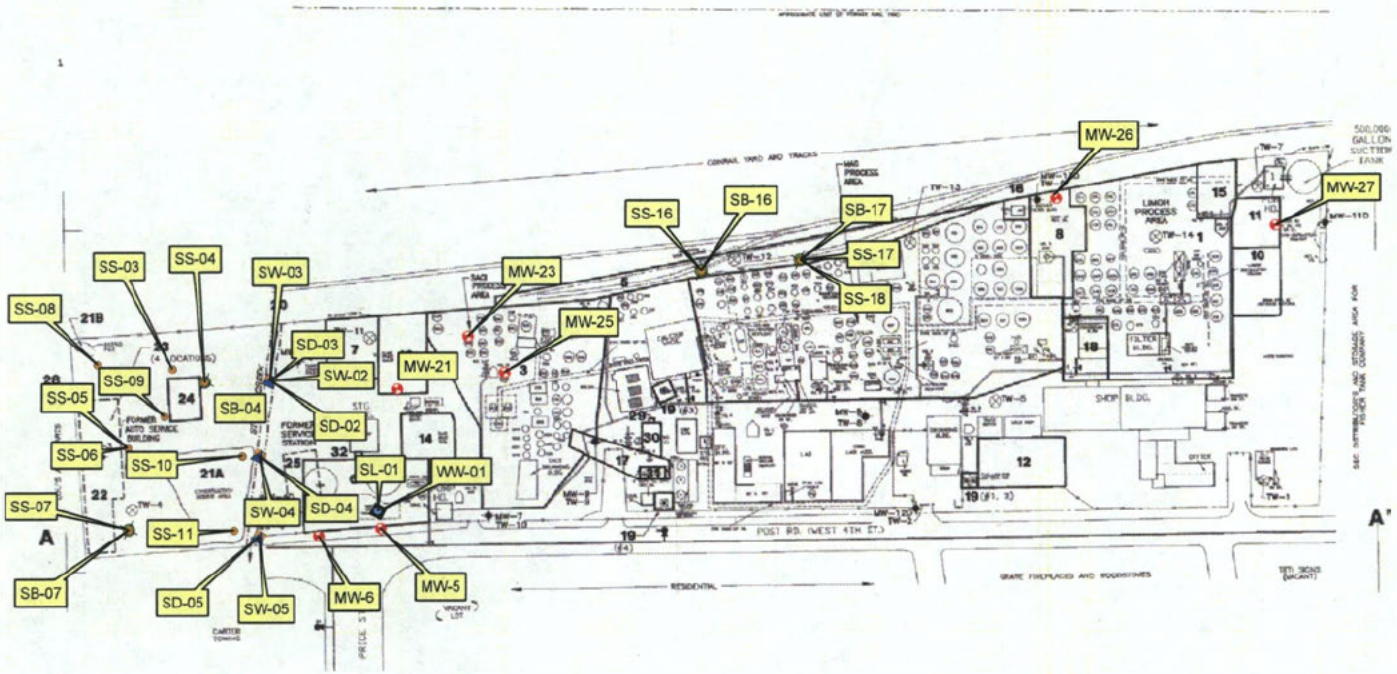
Sample Identifier	Sample Matrix	Sampling Location*	Rationale
SCT-SS-01	Soil	Area outside influence of source	Background
SCT-SB-01	Soil	Area outside influence of source	Background
SCT-SS-02	Soil	Area outside influence of source	Background
SCT-SB-02	Soil	Area outside influence of source	Background
SCT-SS-03	Soil	West side of Stoney Creek in the vicinity of former paint sales building	Source characterization
SCT-SS-04	Soil	West side of Stoney Creek in the vicinity of former paint sales building	Source characterization
SCT-SB-04	Soil	West side of Stoney Creek in the vicinity of former paint sales building	Source characterization
SCT-SS-05	Soil	West side of Stoney Creek in the vicinity of former auto service building	Source characterization
SCT-SS-06	Soil	Duplicate of SCT-SS-05	QA/QC
SCT-SS-07	Soil	West side of Stoney Creek in the vicinity of former auto service building	Source characterization
SCT-SB-07	Soil	West side of Stoney Creek in the vicinity of former auto service building	Source characterization
SCT-SS-08	Soil	West side of Stoney Creek. Exact location TBD.	Source characterization
SCT-SS-09	Soil	West side of Stoney Creek. Exact location TBD.	Source characterization
SCT-SS-10	Soil	Debris/fill area adjacent to Stoney Creek	Source characterization
SCT-SS-11	Soil	Debris/fill area adjacent to Stoney Creek	Source characterization
SCT-SS-12	Soil	Exposed soil in process area; exact location TBD	Source characterization
SCT-SS-13	Soil	Exposed soil in process area; exact location TBD	Source characterization
SCT-SS-14	Soil	Exposed soil in process area; exact location TBD	Source characterization
SCT-SS-15	Soil	Exposed soil in process area; exact location TBD	Source characterization
SCT-SS-16	Soil	Area surrounding drip pan along rail siding	Source characterization
SCT-SB-16	Soil	Area surrounding drip pan along rail siding	Source characterization
SCT-SS-17	Soil	Area surrounding drip pan along rail siding	Source characterization

Sample Identifier	Sample Matrix	Sampling Location*	Rationale
SCT-SB-17	Soil	Area surrounding drip pan along rail siding	Source characterization
SCT-SS-18	Soil	Duplicate sample of SCT-SS-17	QA/QC
SCT-WS-01	Waste	Fly ash material	Source characterization
SCT-WS-02	Waste	Fly ash material	Source characterization
SCT-SW-01	Surface water	Stoney Creek; upstream of site	Background
SCT-SD-01	Sediment	Stoney Creek; upstream of site	Background
SCT-SW-02	Surface water	Stoney Creek; just below WWTP outfall	Assess surface water migration pathway
SCT-SD-02	Sediment	Stoney Creek; just below WWTP outfall	Assess surface water migration pathway
SCT-SW-03	Surface water	Duplicate of SCT-SW-02	QA/QC
SCT-SD-03	Sediment	Duplicate of SCT-SD-02	QA/QC
SCT-SW-04	Surface water	Stoney Creek; 50 feet downstream of SCT-SW-02	Assess surface water migration pathway
SCT-SD-04	Sediment	Stoney Creek; 50 feet downstream of SCT-SD-02	Assess surface water migration pathway
SCT-SW-05	Surface water	Stoney Creek; 50 feet downstream of SCT-SW-03	Assess surface water migration pathway
SCT-SD-05	Sediment	Stoney Creek; 50 feet downstream of SCT-SD-03	Assess surface water migration pathway
SCT-WW-01	Surface water	WWTP holding basin	Source characterization
SCT-SL-01	Sediment	WWTP holding basin	Source characterization
SCT-MW-05	Groundwater	Monitoring well No. 5; located along southeastern property boundary, south of existing WWTP	Assess groundwater migration pathway
SCT-MW-06	Groundwater	Monitoring well No. 6; located in the south corner of the property boundary	Assess groundwater migration pathway
SCT-MW-21	Groundwater	Monitoring well No. 21; located in the former WWTP lagoon	Assess groundwater migration pathway
SCT-MW-23	Groundwater	Monitoring well No. 23; located in the northwestern portion of the process area, above SACI area	Assess groundwater migration pathway
SCT-MW-25	Groundwater	Monitoring well No. 25; located in the central portion of SACI process area	Assess groundwater migration pathway
SCT-MW-26	Groundwater	Installed monitoring well in northern portion of site	Background
SCT-MW-27	Groundwater	Installed monitoring well in northeastern portion of site	Background

Sample Identifier	Sample Matrix	Sampling Location*	Rationale
SCT-MW-30	Groundwater	Duplicate of SCT-MW-05	QA/QC
SCT-TB-01	Aqueous	Trip blank	QA/QC
SCT-TB-02	Aqueous	Trip blank	QA/QC
SCT-FB-01	Aqueous	Field blank	QA/QC
SCT-FB-02	Aqueous	Field blank	QA/QC
SCT-RB-01	Aqueous	Rinsate blank	QA/QC
SCT-RB-01	Aqueous	Rinsate blank	QA/QC

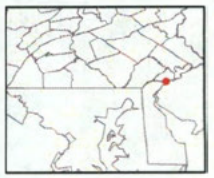
Notes: QA/QC = Quality assurance/quality control

* The exact locations and depths that will best characterize the source will be determined at time of sampling based on field observations.



Legend

- Monitoring Well Location
- Soil Boring Location
- Sediment Sample Location
- Sludge
- Surface Soil Sample Location
- Surface Water Sample Location
- Wastewater



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Feet

Stoney Creek Technologies
Trainer, Delaware County, PA

Figure 4
Proposed Sampling Location Map

WESTON SOLUTIONS

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4.5 IDW AND EQUIPMENT DECONTAMINATION

For the purposes of this FSP, investigation-derived wastes (IDW) are defined as any byproduct of the field activities that is suspected or known to be contaminated with hazardous substances. The performance of field activities will produce waste products such as spent sampling supplies (e.g.,

tubing, foil pans,) and expendable PPE. Dedicated sampling equipment and PPE will be disposed of by the Emergency and Rapid Response Services (ERRS) contractor along with all of their PPE and contaminated waste generated from ongoing removal activities at the site. Non-dedicated sampling equipment, such as a hand auger, will undergo a gross decontamination between each sampling point with Alconox, followed by a double rinse with distilled water, in accordance with WESTON SOP No. 301 *"Decontamination Procedures"* (WESTON 2006h). The liquid IDW will be placed in the site's WWTP.

5.0 ANALYTICAL PARAMETERS AND METHODS

Table 3 summarizes the matrices, analyses, analytical methods, containers, preservatives, detection limits, and maximum holding times for all the samples proposed to be collected during the sampling event.

6.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

This section describes the quality assurance (QA) and quality control (QC) procedures for personnel during the site sampling event, including responsibilities, field QC, laboratory QC, data evaluation, and management.

6.1 RESPONSIBILITY

The WESTON project task lead will be responsible for ensuring that sample quality and integrity are maintained in accordance with WESTON's *EPA Region III START 4 Program-Wide UFP QAPP* (WESTON 2010a).

TABLE 3

ANALYTICAL PARAMETERS

Matrix	Analysis	Analytical Method	Container (per location)	Preservative	Detection Limit	Maximum Holding Time
Soil/ Sediment/ Waste/ Sludge	VOCs	CLP SOW SOM01.2	Three EnCore® samplers and one 2-oz jar or one 4-oz jar with septum	Ice	CRQL	2 days (unpreserved)
	SVOCs Pesticides Aroclors	CLP SOW SOM01.2	One 8-oz jar (amber glass)	Ice	CRQL	14 days
	Inorganics Cyanide	CLP SOW ISOM01.2 ICPAES+Hg+CN	One 8-oz jar	Ice	CRQL	180 days for all metals (except mercury – 28 days; cyanide –12 days)
Surface water/ Wastewater	VOCs	CLP SOW SOM01.2	Three 40-mL vials	HCl pH<2 and ice	CRQL	14 days
	SVOCs Pesticides Aroclors	CLP SOW SOM01.2	Six 1-L ambers	Ice	CRQL	7 days to extraction
	Inorganics Cyanide	CLP SOW ISM01.2 ICPAES+Hg+CN	One 1-L poly One 1-L poly	HNO_3 pH<2 NaOH pH>12	CRQL	180 days for all metals (except mercury – 28 days; cyanide –12 days)
Groundwater	VOCs	CLP SOW SOM01.2	Three 40-mL vials	HCl pH<2 and ice	CRQL	14 days
	SVOCs Pesticides Aroclors	CLP SOW SOM01.2	Six 1-L ambers	Ice	CRQL	7 days to extraction, 40 days to analysis
	Inorganics Cyanide	CLP SOW ISM01.2 ICPAES+Hg+CN	One 1-L poly One 1-L poly	HNO_3 pH<2 NaOH pH>12	CRQL	180 days for all metals (except mercury – 28 days; cyanide –12 days)

Notes:
Amber = Amber glass bottle
CLP = Contract Laboratory Program
CN = Cyanide
CRQL = Contract-required quantitation limit
HCl = Hydrochloric acid
Hg = Mercury
HNO_3 = Nitric acid
ICPAES = Inductively coupled plasma atomic emission spectroscopy
ISM = Inorganic Superfund Methods
L = Liter
mL = Milliliter
NaOH = Sodium hydroxide
SOM = Superfund Organic Methods
oz = Ounce
Poly = Polyethylene bottle
PCB = Polychlorinated biphenyl
SOW = Statement of work
SVOC = Semivolatile organic compound
VOC = Volatile organic compound

6.2 FIELD QUALITY CONTROL

Each sampling location will be noted in the field logbook in accordance with WESTON SOP No. 101, "*Logbook Documentation*" (WESTON 2010d). Field QA/QC measures will consist of collecting field duplicates and equipment blank samples, and maintaining photographic, logbook, and chain-of-custody documentation. Field duplicate samples will be used to test the reproducibility of sampling procedures and results. Field and trip blank samples will be used to verify the proper handling of the samples during sample shipment and laboratory analysis. These measures will be applied in accordance with WESTON's *EPA Region III START 4 Program-Wide UFP QAPP* (WESTON 2010a).

6.3 LABORATORY QUALITY CONTROL

Samples will be shipped to the EPA CLP laboratory assigned by the EPA Region 3's Office of Analytical Services and Quality Assurance (OASQA). Laboratory QC measures will consist of all QC elements identified in the CLP SOW and will include all forms and deliverables required in the SOW.

6.4 DATA VALIDATION

Validation of all analytical data will be performed under the direction of the EPA Region 3 OASQA in accordance with EPA Region 3 modifications to the EPA CLP national functional guidelines for data review (EPA 1993 and EPA 1994). Specifically, inorganic and organic data will be validated at the IM2 and M3 levels, respectively, in accordance with the EPA Region 3 "Innovative Approaches to Data Validation" (EPA 1995).

6.5 DATA EVALUATION AND MANAGEMENT

This section describes how WESTON will (1) evaluate data generated from the sampling event, (2) determine whether data are representative of the site, and (3) make certain that data are secure and retrievable.

6.5.1 Data Evaluation

WESTON will review the analytical package to determine whether any major deficiencies were encountered during analysis and to ensure that the data are interpreted correctly.

6.5.2 Data Representativeness and Completeness

This FSP is designed to obtain data representative of site conditions. If sampling activities vary significantly from this plan because of unexpected conditions in the field or other unforeseeable factors, WESTON will discuss in the Site Inspection report how those variations affect data representativeness.

6.5.3 Data Management

WESTON will request that the laboratory submit the sample analytical data in electronic form, as well as in the required hard-copy analytical data package. WESTON will compare the electronic data deliverables to the hard-copy data package to ensure their consistency. WESTON will use the data to prepare a Site Inspection report for the project. All electronic data will be stored in a Microsoft (MS) Excel or Access database for future retrieval and reference, based on the WAM's requirements. Each hard-copy data package will be kept in the project file located in the WESTON office in West Chester, Pennsylvania, until the data package is officially transferred to the EPA.

7.0 DELIVERABLES

Information obtained during the sampling event will be compiled in a Site Inspection report. The SI report will discuss data collection methods, document sampling locations, and include data summary tables and maps. The format of the SI report will be in accordance with the sample format included in EPA's guidance document, "Conducting SI's Under CERCLA". In addition, the data will be used to calculate a preliminary HRS score. The preliminary HRS score and an explanation of the HRS score will be submitted to EPA as a separate confidential document.

8.0 SCHEDULE

WESTON expects that field work will take place the week of July 11, 2010 for the installation of the monitoring wells and sample collection to take place the week of July 25, 2011. WESTON will ship the collected samples to the assigned CLP laboratory for analysis. WESTON expects to receive validated analytical data from the laboratory within 28 days after the laboratory receives the samples. WESTON will provide EPA with an SI report and preliminary HRS score within 60 days after all site activities are completed and validated data are available. Table 4 below provides the proposed project schedule.

TABLE 4

PROJECT SCHEDULE

Task	Completion Timeframe
Receive and accept TDD	October 2010
Develop site health and safety plan	May 2011
Submit FSP	June 2011
Mobilize to site to install and develop monitoring wells	July 11-12, 2011
Conduct sampling activities	July 25-28, 2011
Receive verbal data from the laboratory	14 days after the laboratory receives the samples
Receive validated analytical data	28 days after laboratory receipt of samples
Evaluate data	4 days after receipt of data
Develop and submit draft SI report and preliminary HRS score	60 days after receiving validated data
Submit final SI report	7 days after receiving comment from EPA WAM
Write AOC and close out TDD	30 days after all work is completed

Notes:
AOC = Acknowledgement of completion
EPA = U.S. Environmental Protection Agency
FSP = Field sampling and analysis plan
TDD = Technical Direction Document
WAM = Work assignment manager

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ATTACHMENT 1

Phase I Identified Areas of Concern

AOC Locations	On site AOC Descriptions
1	Calcium Sulfonation (LIMOH) Processing and Storage Areas
2	Magnesium Sulfonation (MAG) Processing and Storage Areas (CUNO filter house, Oleum ASTs 105/106, Sulfonation Area)
3	Severe Atmospheric Corrosion Inhibitor (SACI) Processing and Storage Areas
4	Wastewater and stormwater collection system
5	Main Rail Sidings
6	Existing Wastewater Treatment Plant
7	Former Wastewater Treatment Plant
8	Solid waste/fly ash storage and blending area between LIMOH and MAG Areas
9	Asbestos (ongoing program of minor abatement)
10	Drum Storage Area: northeast corner of site
11	Drum Storage Area: adjacent to the 500,000 gallon Water AST
12	Drum Storage Area: south side of site, south of weld shop
13	Drum Storage Area: west of SACI Area
14	Drum Storage Area (former): southwest of SACI Area
15	Drum Recycling Area: northeast of corner of LIMOH area
16	CUNO filter house: northwest of LIMOH area
17	Boiler Room fuel oil lines
18	Centrifuge Building hydraulic units
19	Former PCB-containing Transformer Areas
20	Stoney Creek
21	Construction Debris Areas
22	Former Auto Services Building: USTs
23	Former Auto Services Building: out-of-service hydraulic lifts
24	Former Paint Sales Building
25	Former retail service station
AOC Locations	**Offsite AOC Descriptions**
20	Stoney Creek
26	Conrail (Thurlow) Yard (North; potentially upgradient)
27	Large Auto Junkyard (North of Conrail; Potentially upgradient)
28	Lou's Auto Service (West; Potentially upgradient)